

Patent Application
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Docket No. 18794-00094

Title of Invention

WELDING TIP

Cross-Reference to Related Applications

[001] This application is related to, and claims all benefits of U.S. Provisional Patent Application Serial No. 60/423,081, filed on November 1, 2002.

Field of the Invention

[002] The present invention relates to a welding tip for the welding of plastic and plastic containers.

Background of the Invention

[003] Within the art of plastic containers for transporting liquids, solids, etc., such as plastic 55-gallon containers, vents typically must be installed in the container to assist in venting gases that can build up inside and cause failure of a cap or plug on the container or the container itself. Generally, caps or plugs are installed in the containers to help prevent such failure. The caps or plugs are drilled to provide a center aperture therethrough to provide communication between the container interior and the external environment. Such center apertures are covered by vents that permit gases, but not liquids, to be released from the container. Typically, vents are made of a polymeric material, such as polytetrafluoroethylene (PTFE) available under the trademark TEFLON

from E.I. Du Pont Nemours and Company, which permit gases to escape through the cap, but not liquid.

[004] Vents formed from polymeric material such as PTFE are difficult to weld to high or low density plastic caps or plugs. Particularly, welding the vent from such polymeric material may cause burning or cutting of the vent. It would be desirable to improve the welding of polymeric vents to plastic caps and/or plastic containers to avoid accidental burning or cutting of the vent materials.

Summary of the Invention

[005] The present invention is directed to a welding tip that improves the welding of a vent formed from a polymeric material such as PTFE onto plastic such as a plastic cap or plug. The improved welding tip utilizes a shape and structure that provides variable pressure and heat to the polymeric material vent. The variable heat and pressure provide a more controlled melt to the vent to prevent accidental burning or cutting. When the welding tip is applied onto the polymeric material vent placed over the cap or plug, the plastic cap or plug melts and penetrates into the vent to secure the vent to the cap or plug. It has been found that welding tip features such as pressure, temperature, and shape help produce a desirable weld between the polymeric material vent and the plastic cap. The welding tip welds the vent without burning or cutting the vent material.

[006] In one aspect, the present invention is directed to a welding tip. The welding tip includes a cylindrical body. The cylindrical body has an opening at an end of

the cylindrical body defined by a perimeter. The perimeter includes a plurality of knurls. In another aspect, the welding tip perimeter is tapered so that an inner portion of the perimeter extends outwardly further than an outer portion. In a further aspect, the knurls extend from an inner edge of the perimeter to an outer edge of the perimeter.

[007] Still other advantages and benefits of the invention will become apparent to those skilled in the art upon a reading and understanding of the following detailed description.

Brief Description of the Drawings

[008] The invention may take physical form in certain parts and arrangements of parts, a preferred embodiment and method of which will be described in detail in this specification and illustrated in the accompanying drawings that form a part hereof, and wherein:

[009] FIGURE 1 shows a side view of a welding tip **10**.

[0010] FIGURE 2 shows a front view of a welding tip **10**.

Detailed Description of the Preferred Embodiments

[0011] Referring now to the drawings wherein the drawings are for the purposes of illustrating the preferred embodiment of the invention only and not for purposes of limiting same, FIGURE 1 shows a welding tip **10**. The welding tip **10** includes a threaded bolt **12** that is attachable to a weld gun. The welding tip **10** also includes a body **14** connected to the threaded bolt **12**. The body **14** is cylindrical-shaped although other

geometric shapes are also contemplated. Also, the body **14** is metal although other materials are also contemplated. The body **14** defines a central bore **16** along its interior wall **18**. The central bore **16** is conical-shaped although other geometric shapes are contemplated. A perimeter **20** is located at an end of the body **14**. The perimeter **20** is ring-shaped and defines an opening **24** at the end of the body **14**. The perimeter **20** is angled or tapered from its inner portion to its outer portion so that the inner portion of the perimeter **20** extends longitudinally outward further than the outer portion of the perimeter **20**. The perimeter **20** includes one or more knurls **22**. The knurls **22** allow the welding tip **10** to create varying high and low temperature and pressure points in the perimeter **20** that minimize the accidental burning or cutting of the polymeric vent during welding and, thus, provides a controlled melt.

[0012] FIGURE 2 shows a top view of the welding tip **10** including the central bore **16** and the perimeter **20** defining the opening **24**. The perimeter **20** includes one or more knurls **22**. The knurls **22** can be any type of groove, ridge, knot, knob, or protuberance. The knurls **22** reduce the amount of heat and pressure of the welding tip on the polymeric material. The knurls **22** extend radially from the inner edge of the perimeter **20** to the outer edge of the perimeter **20**. Alternatively, the knurls **22** can extend at angularly in a non-radial direction. Also, it is contemplated that the knurls **22** may be curved instead of straight.

[0013] In operation, the welding tip **10** welds a vent formed from a polymeric material such as PTFE to a plastic cap or plug. The perimeter **20** provides an extended

pressure and temperature contact point and creates a controlled melt that radiates outwardly from the inner portion to the outer portion of the perimeter **20** due to the knurls

22. The central bore **16** prevents the welding tip **10** from heating the interior portion where the vent is located, which can damage the vent. Thus, the plastic cap or plug is melted due to the perimeter **20** whereas the vent, which is adjacent to the central bore **16**, does not. The melted portion of the plastic cap or plug penetrates into the vent to create the weld.

[0014] The invention has been described with reference to the preferred embodiment. Obviously, modifications and alterations will occur to others upon a reading and understanding of this specification. It is intended to include all such modifications and alterations insofar as they come within the scope of the appended claims or the equivalents thereof.